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PHARMACEUTICO-ANALYTICAL AND CLINICAL STUDY OF KESHA RANJAKA YOGA

SAHU B[1*] AND HUSSAIN G[2]

1: III Year BAMS Student, **2:** Associate Professor

Department of Rasashastra & Bhaishajya Kalpana, Sri Dharmasthala Manjunatheshwara College of Ayurveda & Hospital, Hassan

***Corresponding Author: Bhumika Sahu: E Mail: bhumikaallen99@gmail.com**

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ABSTRACT

Background: Hair plays a vital role in enhancing the personality of a human as the hair is the first noticeable part of beauty for women as well as men. The scalp and hair conditions also have more psychological impact on human societies. A herbo- mineral combination of triphala and loha bhasma is said as kesharanjaka yoga in Charaka Samhita. Thus, a clinical study to evaluate its effect as a hair dye was taken up to validate the yoga.

Method: Pharmaceutical study was carried out, analytical study such as pH, Loss on drying, Total ash, Acid insoluble ash, Water soluble ash, Water soluble extract and Alcohol soluble extract were carried out as per protocol of testing of ASU drugs. Clinical study of the formulation was done on 30 volunteers.

Results: Amalaki and loha bhasma have kesharanjana (colouring effect) property. The Kesharanjaka yoga showed hair dyeing effect in only two subjects. Physico chemical analysis such as pH, Loss on drying, Total ash, Acid insoluble ash, Water soluble ash, Water soluble extract and Alcohol soluble extract showed the following values 2.80, 80.80%, 37.71%, 12.33%, 3.66%, 11.4% and 8.4% respectively that can be taken as preliminary standard of the yoga.

Conclusion: Kesharanjaka yoga showed hair dyeing effect in two subjects when tried clinically in volunteers suffering from palitya (greying of hair). But, it had positive effect in arresting further greying of hair, improving the texture of hair, avoiding hair fall and dandruff.

Keywords: Kesharanjaka yoga, Loha bhasma, Palitya, Analysis

INTRODUCTION

Chikitsa is mainly of two types i.e., antahparimarjana (internal administration of medicine) and bahirparimarjana (external application of medicine). Lepa is a bahirparimarjana chikitsa that helps in bringing samyata (equilibrium) in sthanika dosha (in situ action) and dhatu **[1]**. Topical applications has been given significance in Ayurveda therapeutics and its emphasis is seen in classical texts of Ayurveda. Description of lepa Kalpana (anointments) is scattered in the classical textbooks. The main basic concept of Lepa is that, wet drugs are pounded to fine paste form and the dry drugs are pounded to fine powder form and mixed with any of the liquid media like Swarasa (juice), Kwatha (decoction), Ghrita (medicated ghee preparations), Taila (medicated oil preparations), Godugdha (milk), Gomutra (cow's urine), Jala (water), etc. **[2]**. Shamana chikitsa (management of disease by pacifying the alleviated dosha) holds an equal weightage in management of various disorders in ayurveda. And in bahirparimarjana chikitsa, lepa kalpana (anointment) has its own importance where various dosage forms are applied externally in situ for relief of various symptoms **[3]**.

Hair plays a vital role in enhancing the personality of a human. As the hair is the first noticeable part of beauty for women as well as men. The scalp and hair conditions also have more psychological impact on human societies. Even minor changes in hair like greying of hair, early hair fall affect the self-confidence and self-esteem of an individual **[4]**. The greying of hair in correspondence to age is a common phenomenon. But in modern era because of changing lifestyle, stress, akaala palitya (premature greying of hair) occur in early age and has become a burning issue, especially in the younger generation.

According to Hendun's research access hair are said to grey prematurely only if greying occurs, before 20 years of age- in Whites, before 25 years of age- in Asians, before 30 years of age- in Africans. And as compared to South Indians, North Indians begin to grey in their late 30's **[5]**. According to Ayurveda Akala Palitya means greying of hair in the

taruna stage that is before 30 years of age. Palitya (greying of hair) is one of the lakshana (symptom) of Jaravasta (old age). The heat of the body produced by anger, grief or exertion mixing with pitta and getting localized in the head causes ripening of the hairs and produces palitya (greying of hair) **[6]**.

Akaala Palitya (premature greying of hair) has significant effect on the self-esteem and social acceptance of the individual as it is viewed as a sign of old age and loss of health and vigour. So, people use chemically inhered hair dye made of harmful chemicals like Acid orange 24[CI 12150], 4-Hydroxyindole, lead acetate etc. that causes allergic reactions, conjunctivitis, asthma, cancer etc. **[7]**. In Ayurveda, Acharya Charaka has mentioned about the preparation of Kesha ranjaka (colouring of hair) from loha bhasma (calyx of iron), triphala and amla dravya. This kesharanjaka is prepared in the form of lepa and is applied externally on the scalp and hair shaft. This lepa will work as a Kesha raga. It is a herbo- mineral preparation and is said to be applied in the form of lepa **[8]**.

METHODOLOGY

Pharmaceutical study:

Table 1: Name of the ingredients of Kesharanjaka yoga

S. No.	Drug name	Latin name	Parts used	Quantity
1	Amalaki	*Amblica officinalis*	Fruit	1kg
2	Bibhitaki	*Terminalia bellirica*	Fruit	1kg
3	Harikati	*Terminalia chebula*	Fruit	1kg
4	Loha bhasma	Calyx of Iron		1kg

1) Method of preparation of churna

1. Triphala (Amalaki, Bibhitaki, Haritaki) churna was taken and mixed with Loha bhasma in a Khalwa Yantra (mortar and pestle) till it attains a homogenous mixture.

Analytical Study

Organoleptic characters

Method

Organoleptic characters of the test sample were documented by means of examination using sensory organs.

Physico – chemical parameters

Determination of pH [9]

The pH value of an aqueous liquid may be defined as the common logarithm of the reciprocal of the hydrogen iron concentration expressed in gram per liter. The acidity or alkalinity of a solution has a profound influence on the decomposition of drug. If it is very acidic or less alkaline there will be more decomposition of the drug. pH influences the rate of oxidation. When the pH is low system is less readily oxidized.

Preparation of buffer solutions: Dissolved one tablet of pH 4, 7 and 9.2 in 100ml of distilled water

Method:

1ml of sample was taken and made up to 10ml with distilled water stirred well and filtered. The filtrate was used for the experiment. Instrument was switched on. 30 minutes time was given for warming pH meter. The pH 4 solution was first introduced and the pH adjusted by using the knob to 4.02 for room temperature 30^0 C. The pH 7 solution was introduced and the pH meter adjusted to 7 by using the knob. Introduced the pH 9.2 solution and checked the pH reading without adjusting the knob. Then the sample solution was introduced and reading was noted. Repeated the test four times and the average reading were taken as result.

Loss on drying at 105°C [10]

10 g of sample was placed in tared evaporating dish. It was dried at 105˚C for 5 hours in hot air oven and weighed. The drying was continued until difference between two successive weights was not more than 0.01 after cooling in desiccators. Percentage of moisture was calculated with reference to weight of the sample.

Total Ash [11]

2 g of sample was incinerated in a tared platinum crucible at temperature not exceeding 450˚C until carbon free ash is obtained. Percentage of ash was calculated with reference to weight of the sample.

Acid insoluble Ash [12]

To the crucible containing total ash, 25ml of dilute HCl was added and boiled. The insoluble matter was collected on ashless filter paper (Whatmann 41) and washed with hot water until the filtrate was neutral. The filter paper containing the insoluble matter was transferred to the original crucible, dried on a hot plate and ignited to constant weight. The residue was allowed to cool in suitable desiccator for 30 min and weighed without delay. The content of acid insoluble ash with reference to the air dried drug was calculated.

Water soluble ash

The ash was boiled for 5 min with 25 ml of water; the insoluble matter was collected on an ashless filter paper, washed with hot water, and ignited for 15 min at a temperature not exceeding 450˚C. The weight of the insoluble matter was subtracted from the weight of the ash; the difference in weight represented the water soluble ash with reference to the air-dried sample.

Water soluble extract [13]

Procedure: 5 grams of air dried drug was macerated with 100ml of distilled water in a closed flask for twenty four hours, shaking frequently during six hours and allowing to

stand for nineteen hours. This was filtered and 25ml of this liquid was pipetted and evaporated to dryness in a tarred flat bottomed dish and dried at 105^0C, to constant weight. The percentage of water soluble extractive with reference to air dried drug was calculated.

Water soluble extractive= (Wt. of dish+ sample) − (Wt. of dish+ residue)/ Initial wt. of sample×100

Alcohol soluble extract [14]

Procedure: 5 grams of the air dried sample was macerated with 100ml of ethanol in a closed flask for twenty four hours, shaking frequently during six hours and allowing to stand for eighteen hours. It was filtered rapidly taking precautions against loss of solvent, 25ml of the filtrate was evaporated to dryness in a tarred flat bottomed dish and dry at 105^0C, to constant weight and weigh. The percentage of alcohol soluble extractive with reference to the air dried drug was calculated.

Clinical Study

Efficiency of action of lepa was assessed in 30 subjects

Inclusion criteria:

- Healthy subjects having premature greying of hair

Exclusion criteria

- Subjects suffering from other systemic diseases

Dispensed: The formulation was dispensed in air tight zip pouches

Quantity: 67g in each zip pouch

No. of applications: 2

Method of application:

- In an iron bowl the formulated powder was added.
- Then takra (buttermilk) was added to the powder.
- It was mixed well a thick consistency pasted was obtained.
- And the paste was kept for overnight.
- In the morning the paste was applied all over the scalp.
- It was kept for 3-4 hours.
- Later it was rinsed off with cold water.

OBSERVATIONS

Pharmaceutical Study

The powder of Triphala and Loha Bhasma when mixed had the characteristic odour of Triphala **(Table 2)**.

Organoleptic characteristics:

Colour: Brown

Touch: Amorphous

Odour: characteristic odour of Triphala

Taste: Pungent and salty

Analytical Study (Table 3)

Clinical study (Table 4)

Total No. of Volunteers: 30

Male : 8

Female : 32

Effect of Kesharanjaka yoga as Hair Dye- a female **(Table 5)**

6.66%, 2 subjects- 1 was a Male & the other

Table 2: Ingredients and obtained quantity of churna

S. No.	Ingredients	Quantity Taken	Quantity obtained
1	Triphala churna	3Kg	4 Kg
2	Loha bhasma	1 Kg	

Table 3: Results of Physico chemical analysis

S. No.	Particulars	Value
1	pH	2.80
2	Loss on drying	80.80%
3	Total ash	37.71%
4	Acid insoluble ash	12.33%
5	Water soluble ash	3.66%
6	Water soluble extract	11.4%
7	Alcohol soluble extract	8.4%

Table 4: Age Group of Volunteers

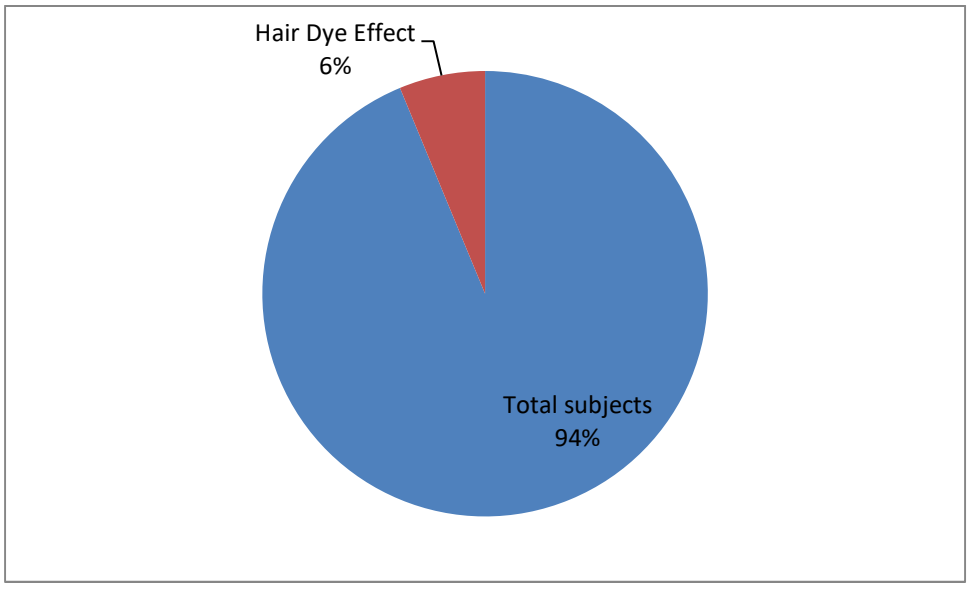
Age Group (years)	15- 25	26- 35	36- 45	46- 55
Male	1	2	4	1
Female	2	12	3	5
Total	3	14	7	6

Table 5: Observations of effect of Kesharanjaka yoga

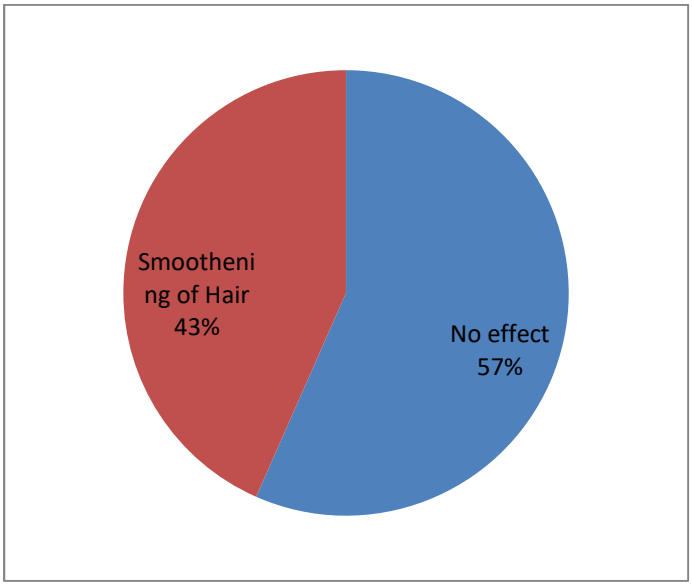
Features	Male	Female	Total
Smoothening of Hair	6	17	23
Reduction of Hair fall	8	22	30
Reduction of Dandruff	6	15	21

Graphs showcasing the results

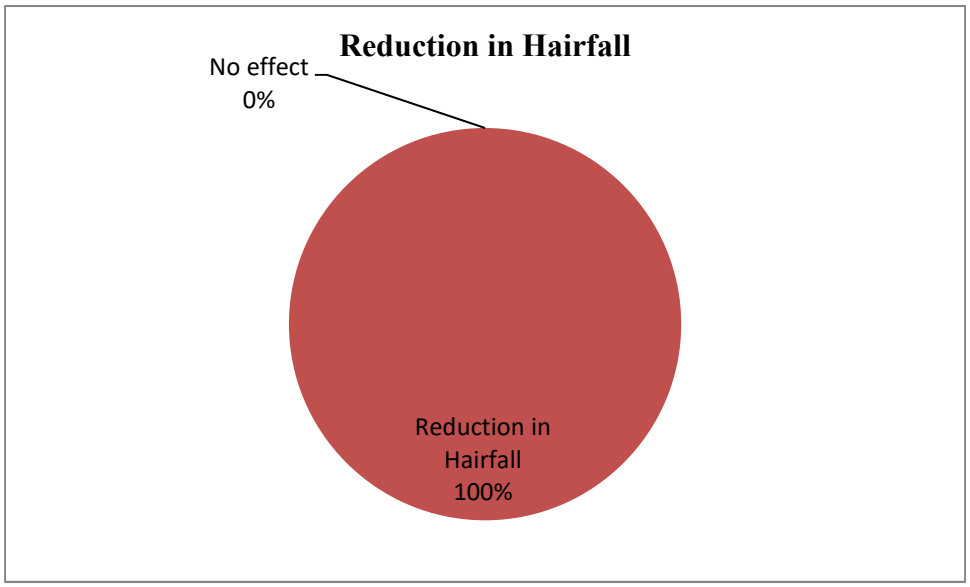
Hair Dye Effect



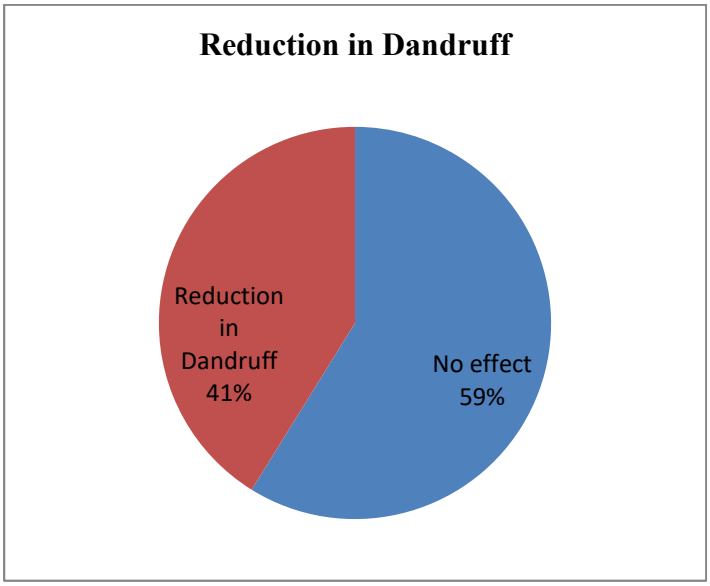
Smoothening of Hair



Reduction of Hair fall



Reduction of Dandruff



DISCUSSION

The colour of Kesharanjaka yoga was brownish in colour. It is due to the presence of Loha bhasma. The taste was pungent and salty, which indicates the presence of inorganic salts in Kshara. Odour was characteristic of the ingredients and is amorphous on touch. Loss on drying indicates the presence of moisture content in drug. Loss on drying in Kesharanjaka yoga was found to be 80.80%. Total ash figure is of importance and indicates to some extent the amount of care taken in the preparation of the drug. In the determination of total ash values the carbon must be removed at as low temperature (450°C) as possible because alkali chlorides, which may be volatile at high temperature, would otherwise be lost. Total ash of Kesharanjaka yoga was 37.71%.

Acid insoluble ash was carried out to evaluate the percentage of insoluble inorganic content of the sample in dilute acid. Since a drug must first pass into solution before it can be absorbed, so the acid insoluble ash test for drug is therapeutically very important. It is intended to provide a step towards the evaluation of the physiological availability of the drug. Acid insoluble ash of Kesharanjaka yoga was 12.33%. Water soluble ash indicates the percentage of solubility of contents of the sample soluble in water. Also the solubility of ash finds out the impurities. Water soluble ash of Kesharanjaka yoga was 3.66%. pH Value of an aqueous liquid may be defined as the common logarithm of the reciprocal of the hydrogen iron concentration expressed in gram per liter. The pH value of kesharanjaka

yoga was 2.80. It shows that the drug is alkaline in nature due to presence of alkali salts. Absorption, efficacy, and irritability of a medicine will depend on the pH value also. If the medicine is very acidic or very alkaline it will cause irritation to the tissues.

Amalaki is used as a colouring agent. Loha bhasma is also used as an ingredient in many formulations mentioned for khalitya and palitya. Though the combination of Haritaki, Vibhitaki, Amalaki and Loha bhasma did not have a hair dye effect in giving colour to the hair, it has shown to be useful in reducing dandruff and hair fall.

Triphala is krimighna and thus has an effect in controlling dandruff and as a result in reducing hair fall. The dried fruit of Amalaki, is said to improve hair hygiene, has long been utilized as an important ingredient of shampoo and hair oil. Thus, the Indian gooseberry acts as a hair tonic and enriches hair growth and pigmentation **[15]**.

Triphala extract exerted highly protective anti- aging effects on human skin cells in vitro. Triphala extract affects gene expression of human skin cells, stimulating collagen-1 and elastin-synthesizing genes and antioxidant genes responsible for the cellular antioxidant, SOD-2. Triphala extract exhibited significant free radical scavenging activity on hydrogen peroxide-induced cell damage and senescence. These results demonstrate potential dermal anti- aging effects of Triphala, such as increasing collagen and elastin and increasing cellular antioxidants **[16]**.

Loha is being used for Kesha ranjana in one or the other form. Most of the formulations mentioned for Kesha ranjana contain Amla or Triphala along with Loha bhasma. Loha Bhasma is a microfine powder containing Fe, Fe_2O_3 and Fe_3O_4. On external application, Iron oxide interact with fine amla particles (ascorbic acid) to produce fused black particles (chelates) capable of dyeing hair **[17]**.

CONCLUSION

Greying of hair is a common complaint in present era effecting all age groups and gender. It has its significance owing to the physical grooming of the individual. Kesharanjaka yoga is a simple formulation that is mentioned to be used as a lepa for coloring of hair. The effect of the yoga as hair dye was seen in only two subjects in clinical study; it had an effect in arresting premature greying of hair, improving the texture of the hair, avoided hair fall and dandruff.

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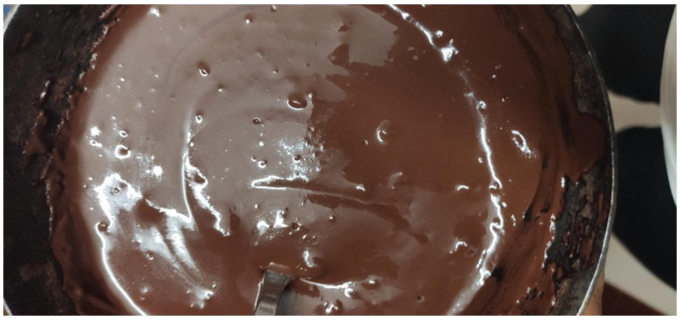
Annexures

Pictures of Ingredients

Loha Bhasma

Triphala Churna

Paste after mixing with Buttermilk



Pictures of Application

Application of the Kesha Ranjaka yoga